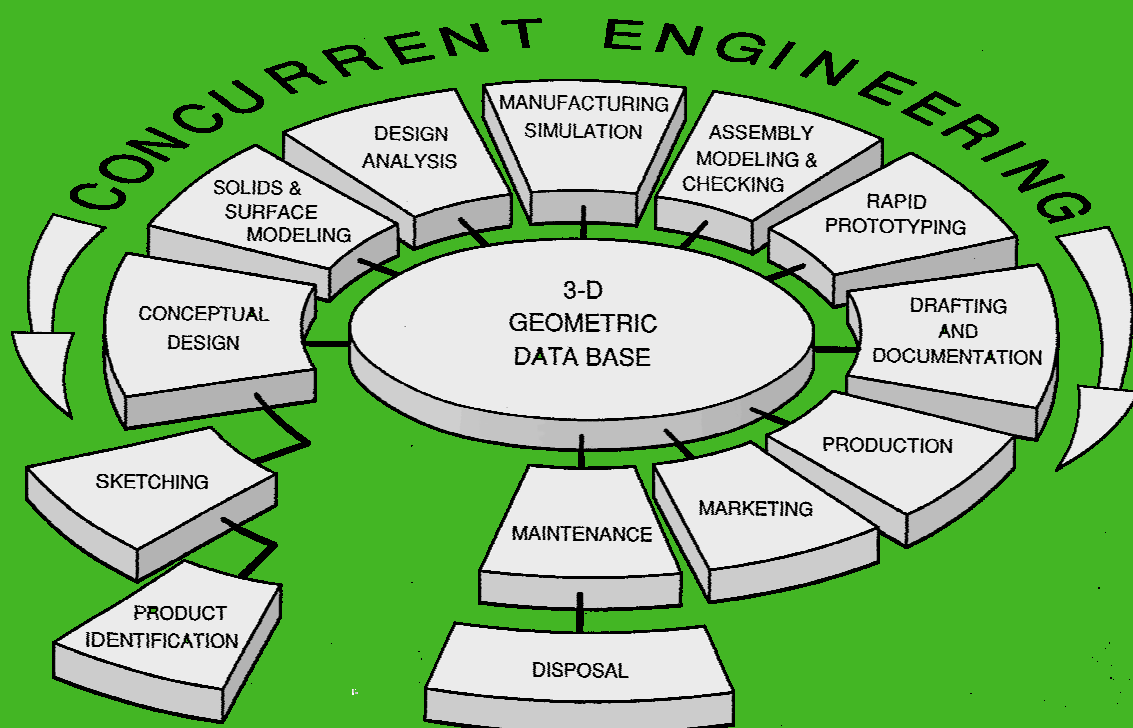


ENGINEERING & COMPUTER GRAPHICS WORKBOOK

Using SolidWorks 2008

Ronald E. Barr
Thomas J. Krueger
Theodore A. Aanstoos
Davor Juricic



SDC
PUBLICATIONS

Schroff Development Corporation
www.schroff.com

Better Textbooks. Lower Prices.

Table of Contents

	<u>Page</u>
1. Computer Graphics Lab 1: 2-D Computer Sketching I	1-1
Introduction to SolidWorks; Screen Layout; Main Pull-Down Menu; Feature Manager Tree; View Orientation; View and Display Toolbars; Sketching Toolbars; Sketching Planes; Line Colors; Starting a New Part; Setting Grids and Units; Using Basic 2-D Primitives; Applying Basic Dimensions; Extruding and Revolving Simple Parts; Printing a Hardcopy.	
Exercise 1.1: Metal Gasket.....	1-8
Exercise 1.2: Cover Plate.....	1-14
Exercise 1.3: Wall Bracket.....	1-19
Exercise 1.4: Machine Handle.....	1-22
Supplementary Exercises.....	1-25
2. Computer Graphics Lab 2: 2-D Computer Sketching II	2-1
Review of All 2-D Sketch Entities; Advanced Sketching Tools; Sketch Editing Tools; Linear and Circular Repeats; Basic Dimensioning; Extruding and Revolving Simple Parts.	
Exercise 2.1: Metal Grate.....	2-3
Exercise 2.2: Torque Sensor.....	2-8
Exercise 2.3: Scalloped Knob.....	2-11
Exercise 2.4: Linear Step Plate.....	2-14
Supplementary Exercises.....	2-19
3. Computer Graphics Lab 3: 3-D Solid Modeling of Parts I	3-1
Adding Sketch Relations; 3-D Features Toolbar; Advanced Extrusion and Revolution Operations; Insert Reference Geometry; Mirror 3-D Feature; Create Linear and Circular 3-D Patterns; Building 3-D Solid Parts.	
Exercise 3.1 Clevis Mounting Bracket.....	3-3
Exercise 3.2 Manifold.....	3-8
Exercise 3.3: Hand Wheel.....	3-12
Exercise 3.4: Toe Clamp.....	3-16
Supplementary Exercises.....	3-19
4. Computer Graphics Lab 4: 3-D Solid Modeling of Parts II	4-1
Creating Advanced 3-D Features: Draft, Shell, Dome, Loft, Sweep; Advanced Extrusion and Revolution Operations; Building 3-D Solid Parts.	
Exercise 4.1: Drawer Tray.....	4-2
Exercise 4.2: Tap-Light Dome.....	4-7
Exercise 4.3 Acme Thread Lead Screw.....	4-11
Exercise 4.4 Jack Stand.....	4-17
Supplementary Exercises.....	4-20

5. Computer Graphics Lab 5: Assembly Modeling and Mating	5-1
Building Multiple 3-D Parts; Color Shading of Parts in an Assembly; Starting a New Assembly File; Tiling the Screen Windows; Assembly Toolbar; Drag and Drop Parts into Assembly; Move and Rotate Component; Mate Parts with Different Mate Types; Print Assembly File.	
Exercise 5.1: Terminal Support Assembly.....	5-4
Exercise 5.2: Swivel Eye Block Assembly.....	5-15
Supplementary Exercises.....	5-25
6. Computer Graphics Lab 6: Analysis and Design Modification I	6-1
Measure Function; Mass Properties Function; Types of Mass Properties and Applicable Units; Print Mass Properties Report; Design Modification of a Solid Model; Setting Up a Design Table; Setting Parameters for the Design Table; Configuration Manager; Print Assembly File.	
Exercise 6.1: Rocker Arm Mass Properties.....	6-4
Exercise 6.2: Socket Plug Design Table.....	6-12
Supplementary Exercises.....	6-17
7. Computer Graphics Lab 7: Analysis and Design Modification II	7-1
Introduction to Finite Element Analysis Using COSMOS/Works; Definition of FEA Terms; Building a Solid Model for an FEA Study; Beginning an FEA Study; Applying Loads and Constraints; Creating a Mesh; Analyzing the Model for Stress Distribution; Printing the von Mises Stress Distribution; Design Modification of a Solid Model Based on Analysis Results.	
Exercise 7.1: Finite Element Analysis of a Pillow Block.....	7-3
Exercise 7.2: Finite Element Analysis of a Piston.....	7-13
8. Computer Graphics Lab 8: Kinematics Animation and Rapid Prototyping	8.1
Introduction to the SolidWorks Animation Wizard; Loading an Assembly File; Exploding an Assembly; Creating the Animation; Animation Controller; Editing the Animation; Saving an .AVI File; Introduction to Physical Simulation, Introduction to Rapid Prototyping; Saving an .STL File; Sample Solid Models for Rapid Prototyping.	
Exercise 8.1: Exploded Animation of the Terminal Support Assembly.....	8-5
Exercise 8.2: Exploded Animation of the Swivel Eye Block Assembly.....	8-10
Exercise 8.3: Rapid Prototyping of a Solid Model Part.....	8-15

9. Computer Graphics Lab 9: Section Views in 3-D and 2-D.....	9-1
Viewing 3-D Section Views of a Solid Model; Printing 3-D Section View; Inserting a Drawing Sheet; Setting Drawing and Hatch Pattern Options; Projecting Three Orthographic Views Onto a Drawing Sheet; Creating the Cutting Plane Line; Making a 2-D Section View; Completing a Section View Drawing; Print Section View Drawing.	
Exercise 9.1: Rod Base Section Views.....	9-3
Exercise 9.2: Tension Cable Bracket Section Views.....	9-9
Exercise 9.3: Milling End Adapter Section Views.....	9-15
Exercise 9-4: Plastic Revolving Ball Assembly Section Views.....	9-21
Supplementary Exercises.....	9-27
10. Computer Graphics Lab 10: Generating and Dimensioning Three-View Drawings	10-1
Inserting a Drawing Sheet; Setting Drawing Sheet Options; Projecting Three Orthographic Views of a Solid Model Onto a Drawing Sheet; Adding Centerlines and Completing the Drawing Views; Setting the Dimensioning Variables; Dimensioning the Drawing; Adding Title Block and Annotations; Print a Drawing.	
Exercise 10.1: Guide Block Drawing.....	10-5
Exercise 10.2: Pipe Joint Drawing.....	10-9
Exercise 10.3: Pedestal Base Drawing.....	10-15
Exercise 10.4: Tooling Pad Drawing.....	10-19
Supplementary Exercises.....	10-27